

08-09-00

A

Please type a plus sign (+) inside this box → ☒

Approved for use through 09/30/2000. OMB 0651-0032
 Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
 Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 C.F.R. § 1.53(b))

Attorney Docket No. 678-484 (P8783)
 First Inventor or Application Identifier Dong-Woo Kim
 Title Device and Method for Reproducing...
 Express Mail Label No. EL484185191US

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

ADDRESS TO: Assistant Commissioner for Patents
 Box Patent Application
 Washington, DC 20231

1. ☒ * Fee Transmittal Form (e.g., PTO/SB/17)
 (Submit an original and a duplicate for fee processing)
2. ☒ Specification [Total Pages 17]
 (preferred arrangement set forth below)
 - Descriptive title of the invention
 - Cross References to Related Applications
 - Statement Regarding Fed sponsored R & D
 - Reference to Microfiche Appendix
 - Background of the invention
 - Brief Summary of the invention
 - Brief Description of the Drawings (if filed)
 - Detailed Description
 - Claim(s)
 - Abstract of the Disclosure
3. ☒ Drawing(s) (35 U.S.C. 113) [Total Sheets 9]
4. Oath or Declaration [Total Pages 2]
 - a. ☒ Newly executed (original or copy)
 - b. ☐ Copy from a prior application (37 C.F.R. § 1.63(d))
 (for continuation/divisional with Box 16 completed)
 - i. ☐ DELETION OF INVENTOR(S)
 Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. §§ 1.63(d)(2) and 1.33(b).

5. ☐ Microfiche Computer Program (Appendix)
6. Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary)
 - a. ☐ Computer Readable Copy
 - b. ☐ Paper Copy (identical to computer copy)
 - c. ☐ Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

7. ☒ Assignment Papers (cover sheet & document(s))
8. ☐ 37 C.F.R. § 3.73(b) Statement of Power of Attorney (when there is an assignee)
9. ☐ English Translation Document (if applicable)
10. ☐ Information Disclosure Statement (IDS)/PTO-1449 ☐ Copies of IDS Citations
11. ☐ Preliminary Amendment
12. ☒ Return Receipt Postcard (MPEP 503) (Should be specifically itemized)
13. ☐ * Small Entity Statement(s) filed in prior application, Status still proper and desired (PTO/SB/09-12)
14. ☒ Certified Copy of Priority Document(s) (if foreign priority is claimed)
15. ☐ Other: _____

* NOTE FOR ITEMS 1 & 13: IN ORDER TO BE ENTITLED TO PAY SMALL ENTITY FEES, A SMALL ENTITY STATEMENT IS REQUIRED (37 C.F.R. § 1.27), EXCEPT IF ONE FILED IN A PRIOR APPLICATION IS RELIED UPON (37 C.F.R. § 1.28)

16. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No: _____

Prior application information: Examiner _____

Group / Art Unit: _____

For CONTINUATION or DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 4b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

17. CORRESPONDENCE ADDRESS

☐ Customer Number or Bar Code Label

(Insert Customer No. or Attach bar code label here)

or ☒ Correspondence address below

Name	Paul J. Farrell				
Address	Dilworth & Barrese 333 Earle Ovington Blvd.				
City	Uniondale	State	NY	Zip Code	11553
Country	U.S.	Telephone	(516) 228-8484	Fax	(516) 228-8516

Name (Print/Type)	Paul J. Farrell	Registration No. (Attorney/Agent)	33,494
Signature	<i>Paul J. Farrell</i>	Date	August 8, 2000

CERTIFICATION UNDER 37 C.F.R. § 1.10

I hereby certify that this correspondence and the documents referred to as enclosed are being deposited with the United States Postal Service on date below in an envelope as "Express Mail Post Office to Addressee" Mail Label Number EL484185191US addressed to: Assistant Commissioner for Patents, Box Patent Application, Washington, D.C. 20231.

Dated: August 8, 2000

Tidde Holmberg

PATENT

Atty. Docket No. 678-484 (P8783)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Assistant Commissioner
for Patents
Washington, D.C. 20231

UTILITY APPLICATION FEE TRANSMITTAL



Sir:

Transmitted herewith for filing is the patent application of

Inventor(s): Dong-Woo Kim

For: DEVICE AND METHOD FOR STORING AND REPRODUCING DIGITAL AUDIO DATA IN A MOBILE TERMINAL

Enclosed are:

☒ 13 page(s) of specification

☒ 1 page(s) of Abstract

☒ 3 page(s) of claims

☒ 9 sheets of drawings ☒ formal ☐ informal

☒ 2 page(s) of Declaration and Power of Attorney

☒ An Assignment of the invention to Samsung Electronics Co., Ltd.

CERTIFICATION UNDER 37 C.F.R. § 1.10

I hereby certify that this New Application Transmittal and the documents referred to as enclosed therein are being deposited with the United States Postal Service on this date August 8, 2000 in an envelope as "Express Mail Post Office to Addressee" Mail Label Number EL484185191US addressed to: Commissioner of Patents and Trademarks, Washington, D.C. 20231.

Tidge Holmberg
(Type or print name of person mailing paper)


(Signature of person mailing paper)

- ☐ This application claims the benefit under 35 U.S.C. §119(e) of U.S. Provisional Application(s) No(s).:

APPLICATION NO(S).:

FILING DATE

_____/_____/_____
_____/_____/_____

☒ Certified copy of applications

Country

Appln. No.

Filed

Korea

99-33207

August 12, 1999

from which priority under Title 35 United States Code, § 119 is claimed
[X] is enclosed.

☐ will follow.

CALCULATION OF UTILITY APPLICATION FEE

For	Number Filed	Number Extra	Rate	Basic Fee \$690.00
TOTAL CLAIMS	11	0	x 18 =	\$0
INDEPENDENT CLAIMS	2	0	x 78 =	\$0
<input type="checkbox"/> Multiple Dep. Claim	0		260	\$0
			TOTAL\$690.00	

- ☐ Verified Statement of "Small Entity" Status Under 37 C.F.R. § 1.27. Reduced fees under 37 C.F.R. § 1.9(f) (50% of total) paid herewith \$.

*Includes all independent and single dependent claims and all claims referred to in multiple claims See 37 C F R § 1 75(c).

☒ The amount of \$40.00 for recording the attached Assignment is enclosed as a separate check.

☒ Check in the amount of \$690.00 and \$40.00 to cover the ☒ recording, ☒ filing fee(s) are attached.

☐ Charge fee to Deposit Account No. 04-1121. Order No. _____
TWO (2) COPIES OF THIS SHEET ARE ENCLOSED.

☒ Please charge any deficiency as well as any other fee(s) which may become due under 37 C.F.R. § 1.16 and 1.17, at any time during the pendency of this application, or credit any overpayment of such fee(s) to Deposit Account No. 04-1121. Also, in the event any extensions of time for responding are required for the pending application(s), please treat this paper as a petition to extend the time as required and charge Deposit Account No. 04-1121 therefor. TWO (2) COPIES OF THIS SHEET ARE ENCLOSED.

Date: August 8, 2000



Paul J. Farrell
Reg. No. 33,494

DILWORTH & BARRESE
333 Earle Ovington Blvd.
Uniondale, NY 11553
Tel. No. (516) 228-8484
Fax. (516) 228-8516

000000" 650E6960

DEVICE AND METHOD FOR STORING AND REPRODUCING DIGITAL AUDIO**DATA IN A MOBILE TERMINAL****PRIORITY**

5

This application claims priority to an application entitled "Mobile Station with a Digital Audio Data Storing/Reproducing Device and Method for Controlling It" filed in the Korean Industrial Property Office on August 12, 1999 and assigned Serial No. 99-33207, the contents of which are hereby incorporated by reference.

BACKGROUND OF THE INVENTION**1. Field of the Invention**

The present invention relates to a mobile phone with a digital audio data storing/reproducing device that enables the mobile phone to store/reproduce digital audio data, which may be supplied from the Internet or a CD player.

2. Description of the related art

The MP3 computer file format is used to compress large amounts of information into small packages that can easily be sent over the Internet. "MP3" is the common name for MPEG 1/2 layer-3, a standard established by the Moving Pictures Engineering Group (MPEG) under the auspices of the International Organization for Standardization (ISO). The MP3 compressed information can be anything capable of being stored as digital information, such as video clips,

art, or music. The information can be decompressed during playback and used or stored as a computer file.

If MP3 technology was employed in a mobile phone, it would be possible for the user of the mobile phone to listen to music without carrying a portable cassette tape recorder or MP3 player.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a mobile station with a device for storing MP3 audio data received from the Internet or a CD player through a computer and reproducing it as desired, and a method therefor.

According to an aspect of the present invention, a mobile station is connected by an adapter with a personal computer in order to download MP3 digital audio data, which was previously downloaded from the Internet to a hard disk in the personal computer. The adapter converts parallel data from the computer into serial data for the mobile station, and vice versa. The MP3 digital audio data is downloaded to the mobile station according to a downloading program stored in the personal computer. A method for reproducing digital audio data in a mobile station comprises the steps of downloading the MP3 audio data stored in the computer to a memory device of the mobile station, and selectively reproducing the MP3 audio data stored in the memory device.

BRIEF DESCRIPTION OF THE DRAWINGS

The preferred embodiment of the present invention will be described more specifically with reference to the drawings attached only by way of example.

5

FIG. 1 is a schematic diagram for illustrating the procedure of downloading digital audio data, which has been downloaded from the Internet or a CD player to a computer, to a mobile station, according to the present invention;

FIG. 2 is a block diagram for illustrating a mobile station provided with a device for storing/reproducing digital audio data according to the present invention;

FIGs. 3A and 3B are flow charts for illustrating the process of a mobile station to receive an MP3 file according to the present invention;

FIG. 4 is a flow chart for illustrating the process of a personal computer for downloading an MP3 file to a mobile station according to the present invention; and

FIGs. 5A and 5B are flow charts for illustrating the process of a mobile station for reproducing the sound of an MP3 file data according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

In the following description of the preferred embodiment, a detailed description of conventional components not directly related to the invention is omitted in order to avoid confusion.

Referring to FIG. 1, a personal computer 100 stores digital audio data or MP3 files in memory. Digital audio data or MP3 files can be downloaded from the Internet or an encoder 400, and the computer 100 is equipped with a download program for downloading digital audio data to a mobile phone 200, which can store and reproduce it. A CD player 300 reproduces the digital audio data recorded on a compact disk (CD). The encoder 400 converts the audio data reproduced by the CD player 300 into a corresponding MP3 file delivered to the personal computer 100. An adapter 500 is needed in order to connect the personal computer 100 and mobile phone 200 when downloading MP3 files. Adapter 500 converts parallel data from the personal computer 100 into serial data for the mobile phone 200, and vice versa. The adapter 500 is connected to the printer port of the personal computer 100 and the J2 connector of the mobile phone 200. The audio data downloaded from the personal computer consists of, for example, 8-bit parallel and control data.

Referring to FIG. 2, a phone module 102 controls the ordinary functions of the mobile station, enabling the digital audio data (i.e., MP3) to be downloaded from a personal computer 100 to the mobile station when there is a download key input on the key pad, and reproducing the sound of the digital audio data when it is selected to play back using the keypad 104. The keypad

104 has a plurality of alphanumeric keys which a user uses to input commands in order to perform mobile communication, to record (to store) digital audio data in the mobile station, to play or to stop the reproduction of sound from the stored digital audio data, to rewind the stored digital audio data, and fast forwarding the stored digital audio data. A display device 106 displays information generated from the keypad 104 and the phone module 102 under the control of the phone module 102. The display device 106 consists of an LCD, and light emitting diodes so that the user can see information displayed on the LCD at night. An RS-232C connector 108 enables the mobile station to exchange audio data (MP3 files) and other data with the personal computer 100. An earphone 110 is connected to the phone module 102 to generate the sound of the audio data supplied from the phone module 102.

An MP3 decoder 114 is for decoding MP3 audio data into corresponding PCM (Pulse Code Modulation) data, and can be, for example, a STO13 module manufactured by STMICROELECTRONICS Co. Specifically, it de-multiplexes the MP3 audio data, which can be an encoded audio stream, at 8 to 320kbps, into control data and audio data in order to Huffman-decode the audio data from the run-length coded compressed signal to the signal of the original length, to subject each sub-band of the signal to re-quantization and re-scaling according to the control data, to recover the resulting data by the inverse discrete cosine transformation, and to inversely filter each sub-band to finally obtain the PCM data. A D/A (digital to analog) converter 112 converts the PCM audio data from the MP3 decoder into the corresponding analog audio data, and can be, for example, a CS4331 module for stereo audio manufacture by CRYSTAL Co. It includes circuits for digital interpolation, delta-sigma D/A conversion digital de-emphasis, and filtering. A Central Processing Unit (CPU) 116, which can be a H8/2134 module manufactured

by HITACHI Co., controls the storage (in memory device 118) and reproduction of the MP3 audio data received from the phone module.

The personal computer 100, as shown in FIG. 1, stores on the hard disk a MP3 file downloaded from the Internet or the encoder 400 connected to CD player 300. The personal computer 100 also must be installed with a MP3 control program for the mobile station. For example, the CD storing the MP3 control program is inserted into the CD driver of the computer, and then used to generate an MP3 control program folder on the personal computer 100. Then, the personal computer 100 is connected to the mobile station 200 with the adapter cable.

Hereinafter, the process of downloading an MP3 file from a personal computer to the mobile station is described in connection with Figs. 3A to 4. Referring to FIG. 3A, detecting the main menu selection key inputted from the keypad 104 in step 701, the phone module 102 proceeds to step 702 to display the main menu in the display device 106 as shown in Table 1.

Table 1

0.	MP3 Player
1.	Voice Dial
2.	Bell/Vibrator Intensity
3.	Time Schedule
4.	Arrangement/Alarm
5.	Private Information
6.	Additional Services

If the user presses the key numbered '0' in step 703, the phone module 102 proceeds to step 704 to display the MP3 play menu in the display device as shown in Table 2.

5

Table 2

MP3 Play	
0.	Play Mode
1.	Download
2.	File List
3.	Delete File

As shown in Table 2, the keys numbered respectively '0', '1', '2', and '3' are pressed in order to play, an MP3 file, download an MP3 file, list the names of the stored MP3 files, and delete the stored MP3 files, respectively. For example, if the key numbered '1' (the download command) is pressed in step 705, the phone module 102 proceeds to step 706 to display the downloading message in the display device 106.

Meanwhile, referring to FIG. 4A, if the user clicks the MP3 manager icon displayed on the desktop screen of the personal computer 100 in step 801, the computer 100 displays a menu list of MP3 files on the monitor screen in step 802. Selecting an MP3 file from the file list menu in step 803, and clicking the selected MP3 file in order to download it in step 804, the computer

100 proceeds in step 805 to transmit the file download header message FILE_DOWNLOAD
 HEADER MSG through the RS-232C connector 108 to phone module 102 in the mobile station.
 Then, as shown in FIG. 3A, the phone module 102 detects the FILE_DOWNLOAD HEADER
 MSG in step 707 and proceeds in step 708 to return the file download message acknowledge
 message ACK/SAME_FILE_FOUND MSG to the personal computer 100. Accordingly, as
 5 shown in FIG. 4A, the personal computer 100 receives the ACK/SAME_FILE_FOUND MSG in
 step 806, and proceeds, jumping to FIG. 4B, in step 807 to transmit the MP3 file data FILE
 BODY1 to the phone module 102. Then, as shown in FIG. 3B, the phone module 102 detects
 FILE BODY1 in step 709, proceeds in step 710b to receive the MP3 file data after returning the
 MP3 file data acknowledge message to the personal computer 100 in step 710a. The MP3 file
 data received is transferred to the CPU 116, and then stored into the memory 118.

Subsequently, as shown in FIG. 4B, the personal computer 100, after detecting the FILE
 BODY1 acknowledge message in step 808, transmits the file transmission complete message
 FILE_TAIL_MSG to the phone module 102 in step 809 after completing the transmission of the
 MP3 file data. Then, returning to FIG. 3B, the phone module 102 proceeds to step 712 or returns
 to step 709 depending on whether the FILE_TAIL_MSG is received (step 712) or not (step 709)
 in step 711. The acknowledgment of the MP3 file information is transmitted to the personal
 computer, and, if the MP3 file is not received within five seconds when receiving the MP3 file
 20 from the personal computer, the existing received data is canceled and returns to the initial value.
 When the FILE_TAIL_MSG is received in step 711, the phone module 102 transmits the end of
 acknowledge message END_OF_ACK_MSG to the personal computer in step 712. Then, as
 shown in FIG. 4B, the personal computer 100, after detecting END_OF_ACK_MSG in step 810,

proceeds to step 811 to transmit the end of file transmission message END_OF_MSG to the phone module. Finally, in step 812, the personal computer 100 either returns to step 803 or terminates the process, depending on whether there is another file to be transmitted (step 803) or not (end). Meanwhile, returning to FIG. 3B, the phone module 102, after detecting
 5 END_OF_MSG in step 713, proceeds to step 714 to transmit the end of acknowledge message END OF ACK to the personal computer 100. Finally, in step 715, the phone module terminates the download process or returns to step 709 depending on whether the end key is inputted from the keypad 104 (end) or not (step 709).

Next, the procedure of reproducing the sound of the MP3 file stored in the mobile station will be described in connection with Figs. 5A, 5B and 5C. If the phone module 102 detects that the main menu selection key is input from the keypad 104 in step 901, it proceeds to step 902 to display the main menu as shown in Table 1 in display device 106. If the user presses key No.0 in step 903 to select the MP3 payer, the phone module 102 proceeds to step 904 to display the MP3 play menu shown in Table 2, in display device 106. In the MP3 play menu, the user presses key No. 0 to play an MP3 file, key No. 1 to download an MP3 file, key No. 2 to view the file list, and key No. 3 to delete a file. If he presses No. 0 key to play in step 905, the phone module 102 proceeds to step 906 to display the detailed MP3 play mode menu shown in Table 3 in the display device.

Table 3

MP3 Play Mode
1. Rewind
2. Play/Stop
3. Fast Forward
4. Play Mode Set
5. View File
6. Left/Right Volume Control

In the MP3 play mode menu, the user may press key No. 1 to rewind, key No. 2 to play/stop, key No. 3 to fast forward, key No. 4 to set the play mode, key No. 5 to view the file, and key No. 6 to control the right and left volumes. For example, as shown in FIG. 5B, if the phone module 102 detects the rewind key No. 1 input in step 907, the phone module 102 proceeds in step 908 to rewind. The rewind command might be to skip to the previous or the first music piece by a short or prolonged press of the rewind key while not playing the music, to the starting position of the music piece presently being played by a short press of the rewind key while playing the music, to the starting position of the previous music piece by a short press of the rewind key when starting the following music piece, or to a desired rewind position by pressing the rewind key for a proper prolonged time while playing the music.

If the play/stop key No. 2 is pressed in step 909, the phone module 102 proceeds in step 910 to stop if it is presently playing, or play if it is presently stopped. If the fast forward key No. 3 is pressed in step 911, the phone module 102 proceeds in step 912 to fast forward. The fast

forward command might be to skip to the next or the last music piece by a short or prolonged press of the rewind key while not playing, to skip to the starting position of the next music piece by a short press of the fast forward key while playing the music, or to the music piece of a desired forward position by pressing the rewind key for a proper prolonged time while playing the music. As shown in FIG. 5C, if the play mode set key No. 4 is pressed in step 913, the phone module 102 proceeds to step 914 to set a different play mode when the user repeatedly presses the play mode set key, thus selecting the different play modes shown in Table 4.

Table 4

REPEAT	Repeating the present music piece until pressing the stop key
REPEAT ALL	Repeating the presently ordered sequence of music pieces until pressing the stop key
SHUFFLE	Shuffled playing of selected music pieces
REPEAT SHUFFLE	Repeating shuffled playing of selected music pieces until pressing the stop key
NORMAL	Ordinary playing mode

Each of the different playing modes shown in Table 4 may be selected by sequentially pressing the play mode set key No. 4.

If the view file key No. 5 is inputted through the keypad 104 in step 915, the phone module 102 proceeds to step 916 to display the information of the MP3 files for a predetermined duration. Namely, if the view file key is pressed while playing a file, its information is displayed

for a short duration. Alternatively, if the key is pressed while not playing the music, the information of the file presently held is displayed. If the left/right volume control key No. 6 is inputted through the keypad 104, the phone module 102 proceeds to step 918 to display the presently set intensities of the right and left volumes of the earphone, in order to adjust them by means of proper selection keys such as up and down keys provided in the keypad. Returning to FIG. 5B, finally detecting the end key input through the keypad 104 in step 919, the phone module terminates the detailed MP3 play mode menu. Or otherwise, it waits to perform the steps 907 to 918 according to corresponding key inputs from the keypad 104.

Additionally, the inventive MP3 play menu may include call receiving, displaying play state, file list, all deletion, memory state, download information, etc. The call receiving is to select connection or non-connection with a call during music playing. If non-connection is selected, the phone module does not generate a ring, called during music playing. However, this is not applied when the phone module does not play the music. The displaying play state is to display the volume intensity, playing time, playing sequence, etc. This, however, increases the consumption of the battery. The file list is to display the list of the ordered music pieces, and the size of a selected music piece, and makes it possible to delete a selected music piece. The all deletion is to all of the MP3 files stored in the memory. The memory state is to display the information of the total and used sizes of the memory. The download information is to display the names, dates and times of the MP3 files downloaded.

Thus, the present invention provides means for enabling the mobile station to store and reproduce the MP3 music files downloaded from a personal computer, so that the user may enjoy

the MP3 file music without an additional MP3 player.

While the present invention has been described in connection with specific
embodiments accompanied by the attached drawings, it will be readily apparent to those skilled
in the art that various changes and modifications may be made thereto without departing from the
spirit of the present invention.

WHAT IS CLAIMED IS:

1. A mobile phone for storing and reproducing digital audio data, comprising:

a keypad having a plurality of alphanumeric keys used for commanding a phone module

to make mobile communication and to manipulate digital audio data;

a phone module for controlling the ordinary functions of said mobile phone, for enabling digital audio data to be downloaded from a personal computer to said mobile phone according to a key input through said key pad, and for enabling the sound of the digital audio data to be reproduced according to a key input through said key pad;

an RS-232 connector for connecting said phone module and personal computer to exchange digital audio data and other data; and

a digital audio data module for storing the digital audio data from said phone module for playing or stopping sound reproduced from the stored digital audio data, for rewinding the sound reproduced, and for fast-forwarding the sound reproduced.

2. The mobile phone as recited in claim 1, wherein the digital audio data is MPEG (Moving Pictures Engineering Group) 1/2 Layer-3, or MP3, data and the digital audio data module is a MP3 module.

3. The mobile phone as recited in claim 2, wherein said MP3 module further comprises:

a memory device for storing MP3 digital audio data;

a Central Processing Unit (CPU) for controlling the MP3 audio data received from said phone module to be stored in or reproduced from said memory device;

an MP3 decoder for de-multiplexing MP3 audio data into control data and audio data for Huffman-decoding the audio data from run-length coded compressed signals to original length signals, for subjecting each sub-band of the signal to re-quantization and re-scaling according to said control data, for recovering the resulting data by an inverse discrete cosine transformation, and for inversely filtering each sub-band to finally obtain PCM (Pulse Code Modulation) data; and

a digital to analog (D/A) converter for converting PCM audio data delivered from said MP3 decoder into corresponding analog audio data.

4. A method for reproducing digital audio data in a mobile phone, comprising the steps of: downloading digital audio data stored in a personal computer to a memory device of said mobile phone; and selectively reproducing or playing said digital audio data stored in said memory device; wherein the mobile phone can be connected to a personal computer by means of an adapter, said adapter for converting personal computer parallel data to mobile phone serial data and vice-versa.

5. The method as recited in claim 4, wherein the digital audio data is MPEG (Moving Pictures Engineering Group) 1/2 Layer-3, or MP3, data.

6. The method as recited in claim 4, wherein the step of reproducing said digital audio data comprises the steps of:

selecting digital audio data play mode from a main menu;

displaying a detailed menu for playing said digital audio data; and
sequentially playing said digital audio data upon selecting a play key in said detailed menu.

5 7. The method as recited in claim 6, further comprising the step of:
rewinding said digital audio data to a first stored position of said digital audio data upon selecting a rewind key in said detailed menu.

8. The method as recited in claim 4, further comprising the step of:
replaying said digital audio data from a first stored position upon prolonged pressing of a rewind key during playing.

9. The method as recited in claim 4, further comprising the step of:
moving a playing position to a starting point of said digital audio data next to that presently being played upon a short press of a fast forward key during playing.

10. The method as recited in claim 6, further comprising the step of:
fast forwarding a playing position to a starting point of a next digital audio data upon a short press of a fast forward key in said detailed menu.

11. The method as recited in claim 4, further comprising the step of:
fast-forwarding a playing position to a starting point of a last digital audio data.

ABSTRACT

A method and device for reproducing digital audio data in a mobile station is disclosed. The mobile station can be connected by an adapter with a personal computer in order to download MP3 digital audio data which was previously downloaded from the Internet to a hard disk on the personal computer. The adapter converts parallel data from the computer into serial data for the mobile station, and vice versa. The MP3 digital audio data is downloaded to the mobile station according to a downloading program stored in the personal computer. One method according to the invention comprises the steps of downloading the MP3 audio data stored in the computer to a memory device of the mobile station, and selectively reproducing the MP3 audio data stored in the memory device.

FIG. 1

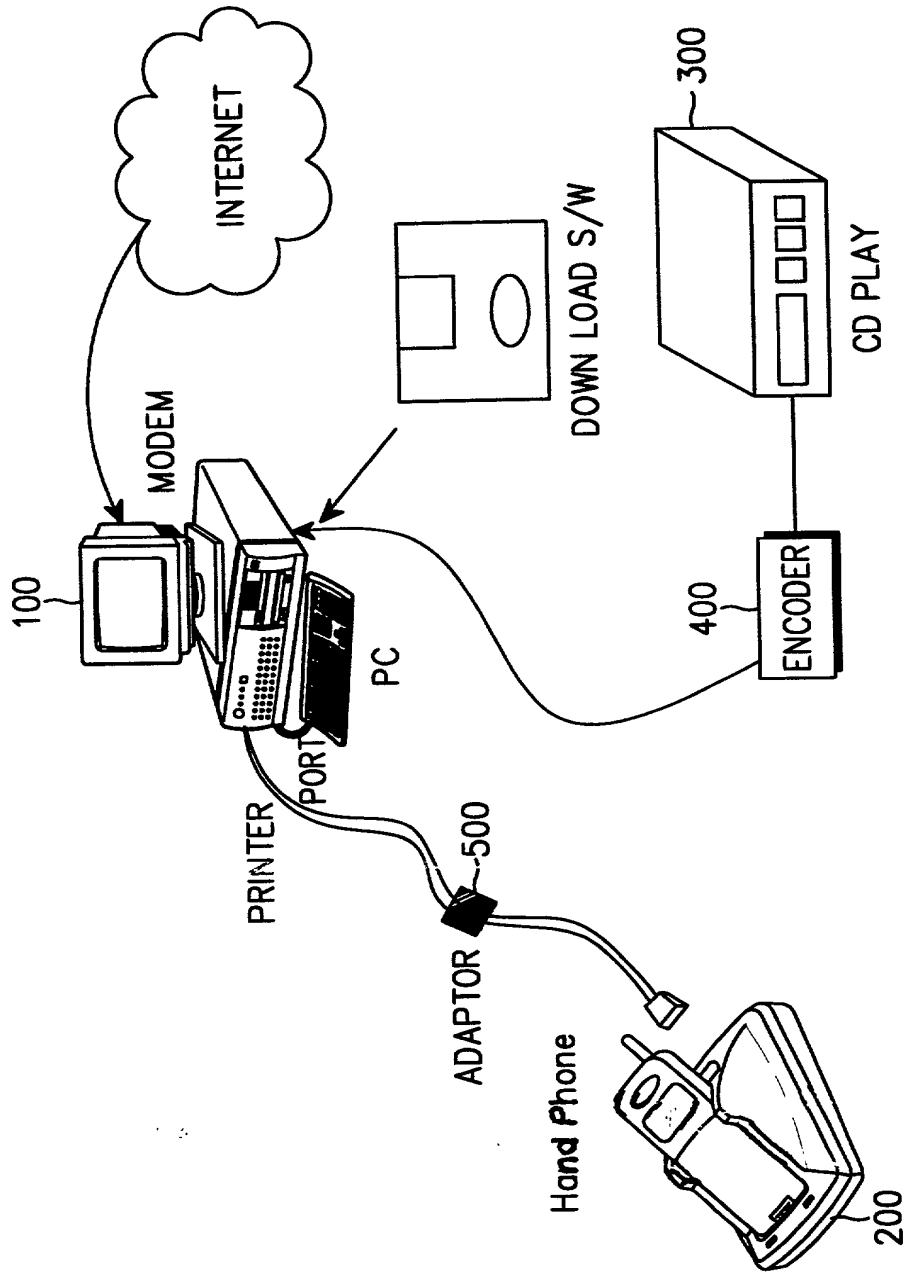
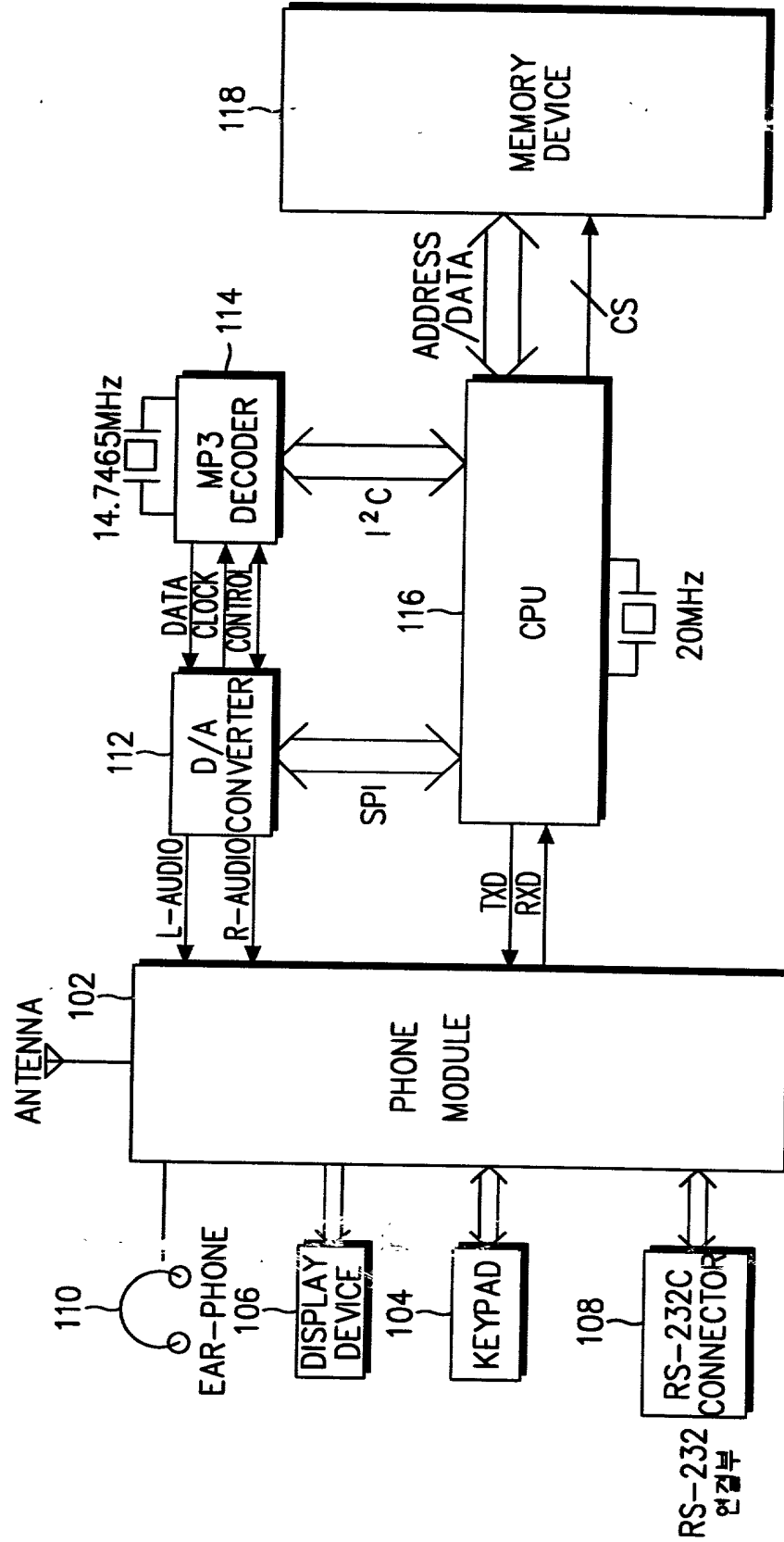


FIG. 2



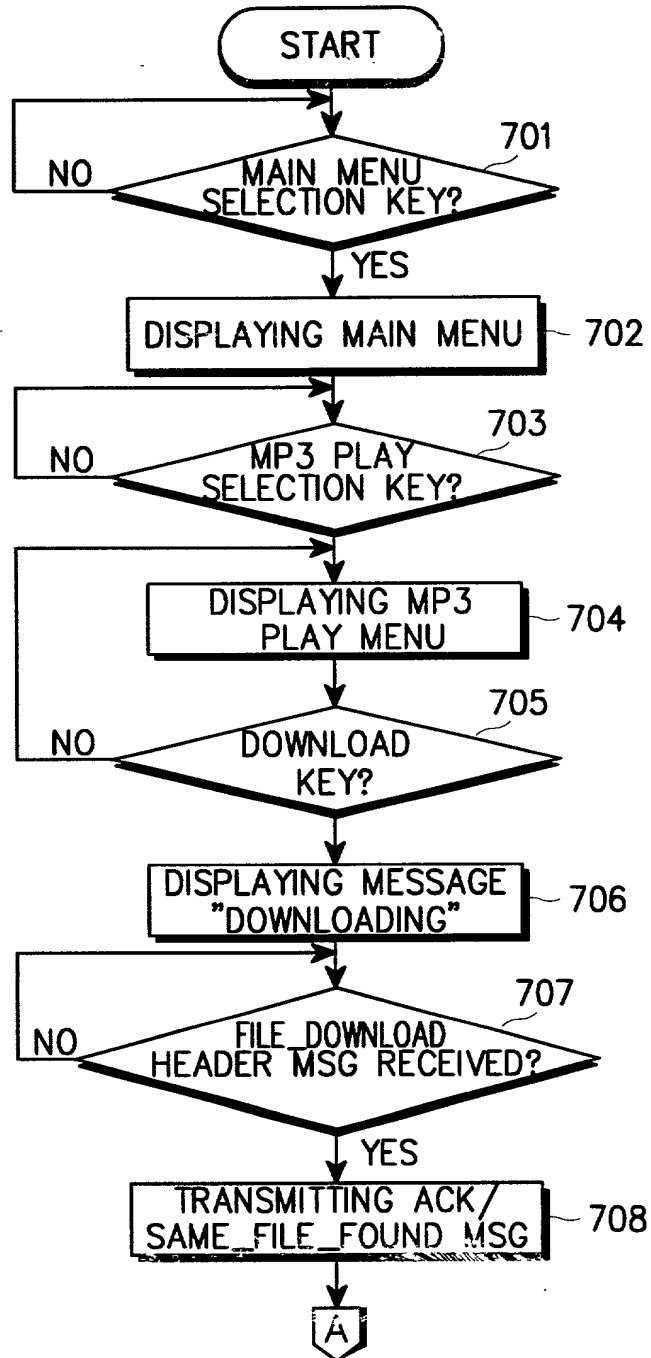


FIG. 3A



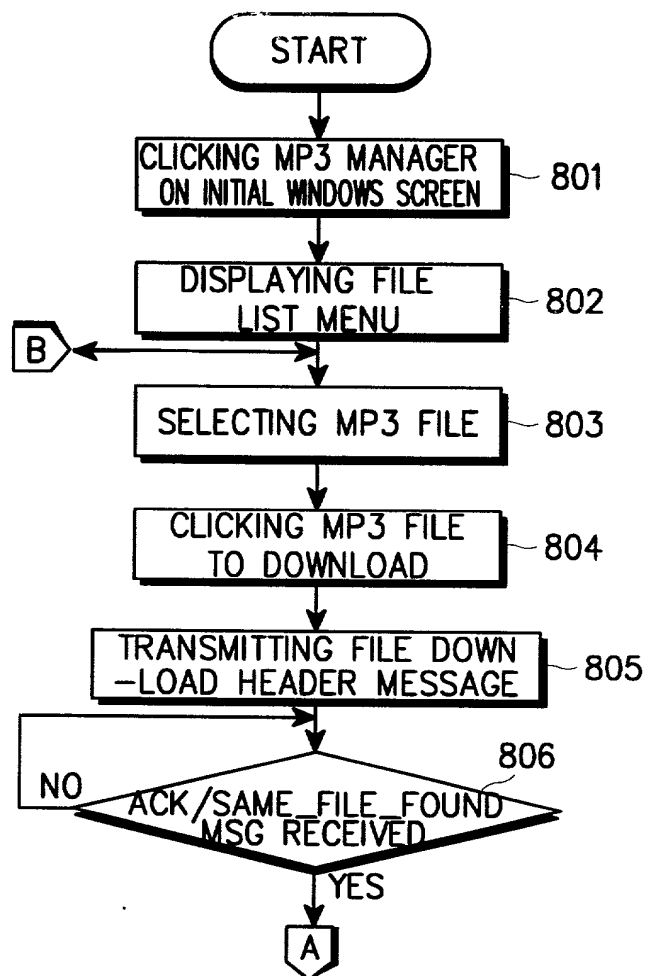
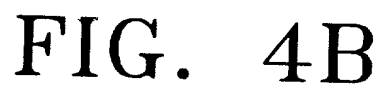


FIG. 4A



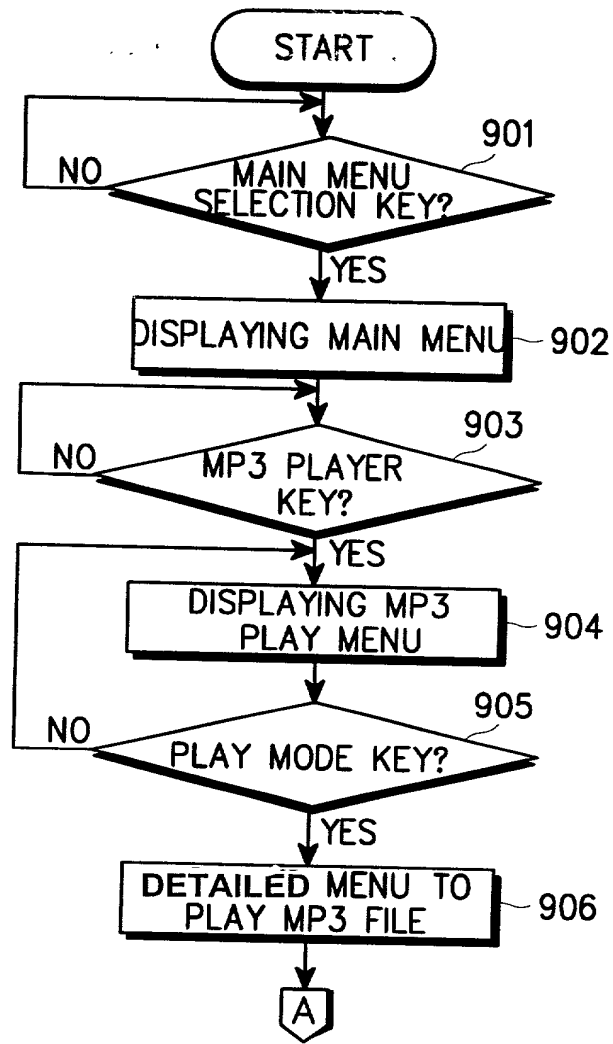
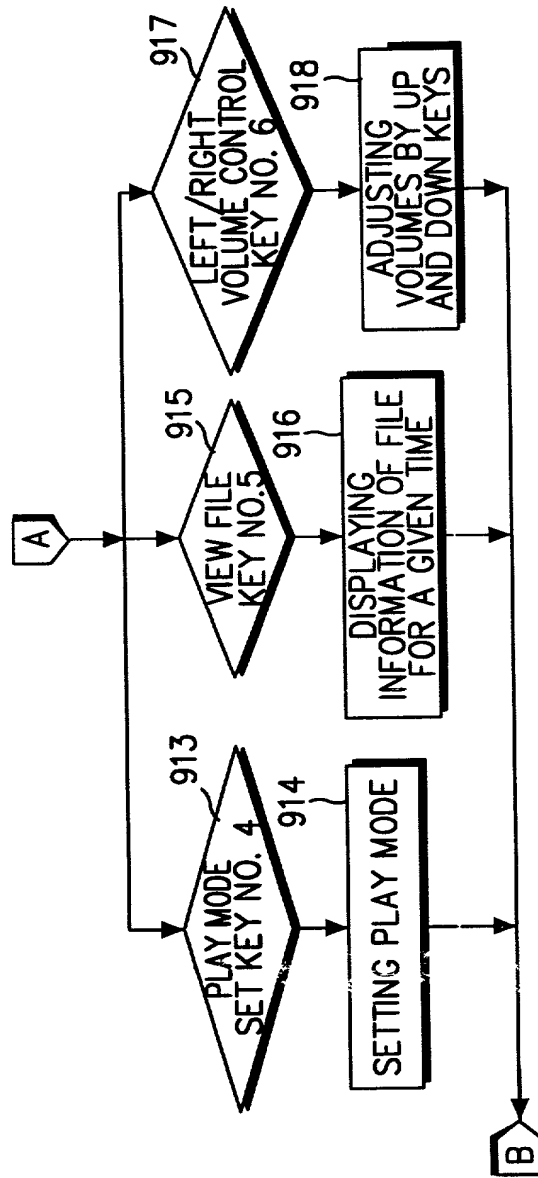


FIG. 5A

```
graph TD
    A[A] --> 907{REWIND  
KEY NO. 1}
    907 --> 908[REWINDING]
    908 --> 909{PLAY/STOP  
KEY NO. 2}
    909 --> 910[PLAYING/  
STOPPING]
    909 --> 911{FAST-FORWARD  
KEY NO. 3}
    911 --> 912[FAST-FORWARDING]
    908 --> 919{END KEY INPUT?}
    910 --> 919
    912 --> 919
    919 -- YES --> END([END])
    919 -- NO --> B[B]
    B --> A
```

FIG. 5C



PTO/SB/01 (6/95)

DECLARATION

Docket No. 678-484 (P8783)

AS A BELOW NAMED INVENTOR, I hereby declare that:

My residence, post office address and citizenship are as stated next to my name.

I believe that I am the original, first and sole (if only one name is listed below), or an original, first and joint inventor (if plural names are listed below), of the subject matter which is claimed and for which a patent is sought on the invention entitled:

TITLE: DEVICE AND METHOD FOR STORING AND REPRODUCING DIGITAL AUDIO DATA IN A MOBILE TERMINAL

the specification of which either is attached hereto or indicates an attorney docket no. 678-484 (P8783), or:

☐ was filed in the U.S. Patent & Trademark Office on _____ and assigned Serial No. _____.

☐ and (if applicable) was amended on _____.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose information which is material to patentability and to the examination of this application in accordance with Title 37 of the Code of Federal Regulations § 1.56. I hereby claim foreign priority benefits under Title 35, U.S. Code § 119(a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT international application which designated at least one country other than the United States, or § 119(e) of any United States provisional application(s), listed below and have also identified below any foreign applications for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Priority Claimed:

(Application Number)	(Country)	(Day/Month/Year filed)
1999-33207	Korea	12/08/1999

Yes [X] No []

(Application Number)	(Country)	(Day/Month/Year filed)

Yes [] No []

I hereby claim the benefit under Title 35, U.S. Code, § 120, of any United States application(s), or § 365(c) of any PCT international application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT international application(s) in the manner provided by the first paragraph of Title 35, U.S. Code, § 1.2, I acknowledge the duty to disclose information material to patentability as defined in Title 37, The Code of Federal Regulations, § 1.56(a) which became available between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial Number)	(Filing Date)	(STATUS: patented, pending, abandoned)

(Application Serial Number)	(Filing Date)	(STATUS: patented, pending, abandoned)

I hereby appoint the following attorneys: PETER G. DILWORTH, Reg. No. 28,450; RICHARD S. BARRESE, Reg. No. 25,253; DAVID M. CARTER, Reg. No. 30,948; PAUL J. FARRELL, Reg. No. 33,494; PETER DELUCA, Reg. No. 32,978; JEFFREY S. STEEN, Reg. No. 32,063; ADRIAN Y. CALDERONE, Reg. No. 31,748; GEORGE M. KAPLAN, Reg. No. 28,375; JOSEPH W. SCHMIDT, Reg. No. 35,920; RAYMOND E. FARRELL, Reg. No. 34,818; RUSSELL R. KASINER, Reg. No. 38,183; CHRISTOPHER G. TRAINOR, Reg. No. 39,817; GEORGE LIKOURZOS, Reg. No. 40,067; JAMES M. LOEPFLER, Reg. No. 37,873; EDWARD C. MEAGHER, Reg. No. 41,189; SUSAN L. MESS, Reg. No. 37,360; MICHAEL P. DILWORTH, Reg. No. 37,311; PETER B. SORELL, Reg. No. 44,349; and GLENN D. SMITH, Reg. No. 42,158, each of them of DILWORTH & BARRESE, 333 Earle Ovington Boulevard, Uniondale, New York 11553 to prosecute this application and to transact all business in the U.S. Patent and Trademark Office connected therewith and with any divisional, continuation, continuation-in-part, reissue or re-examination application, with full power of appointment and with full power to substitute an associate attorney or agent, and to resolve all patents which may issue thereon, and request that all correspondence be addressed to:

Page 1 of 2

Paul J. Farrell, Esq.
DILWORTH & BARRESE
333 Earle Ovington Boulevard
Uniondale, New York 11553
Tel. No.: (516) 228-8484

I HEREBY DECLARE that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 U.S. Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

FULL NAME OF FIRST OR SOLE INVENTOR: Dong-Woo KIM Citizenship Korea
Inventor's signature: DONG-WOO KIM Date: 10 July 2000
Residence & Post Office Address: 37, Songjong-dong, Kumi-shi, Kyongsangbuk-do, Korea

FULL NAME OF SECOND JOINT INVENTOR: _____ Citizenship _____
Inventor's signature: _____ Date: _____
Residence & Post Office Address: _____

FULL NAME OF THIRD JOINT INVENTOR: _____ Citizenship _____
Inventor's signature: _____ Date: _____
Residence & Post Office Address: _____

FULL NAME OF FOURTH JOINT INVENTOR: _____ Citizenship _____
Inventor's signature: _____ Date: _____
Residence & Post Office Address: _____

FULL NAME OF FIFTH JOINT INVENTOR: _____ Citizenship _____
Inventor's signature: _____ Date: _____
Residence & Post Office Address: _____

FULL NAME OF SIXTH JOINT INVENTOR: _____ Citizenship _____
Inventor's signature: _____ Date: _____
Residence & Post Office Address: _____

Page 2 of 2